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(11) EP 0 699 819 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
29.12.1997 Bulletin 1997/52

(51) Int Cl.⁶: E21B 33/127, E21B 33/124,
E21B 33/12, E21B 49/08,
E21B 27/02, E21B 43/25,
E21B 34/12, E21B 34/14

(43) Date of publication A2:
06.03.1996 Bulletin 1996/10

(21) Application number: 95305666.0

(22) Date of filing: 15.08.1995

(84) Designated Contracting States:
DE FR GB NL

(30) Priority: 15.08.1994 US 292131

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(54) Method and apparatus for well testing or servicing

(57) A well (10) is tested or serviced, especially in early evaluation before the borehole (12) is cased, using an outer tubing string (16) run into the well and having a packer (18) which is set in the open, uncased borehole (12) above the subsurface formation (14) of interest. An inflation passage is provided, preferably having an inflation valve associated therewith which is operated by manipulation of the tubing string (16). A communication passage (32) communicates the interior of the outer tubing string (16) with the borehole (12) below the packer (18). An inner well tool (42) is run into the outer tubing string (16) and engaged therewith, whereupon it is placed in fluid communication with the subsurface formation (14) to either sample the formation or treat the formation. Preferably, a circulating valve (38) is provided above the packer (18) to allow fluid circulation in the well annulus (39) during the testing procedure to prevent differential sticking of the outer tubing string (16). The inner well tool (42) may include an inner tubing string, preferably coiled tubing, which may include annulus pressure responsive tester valves therein.

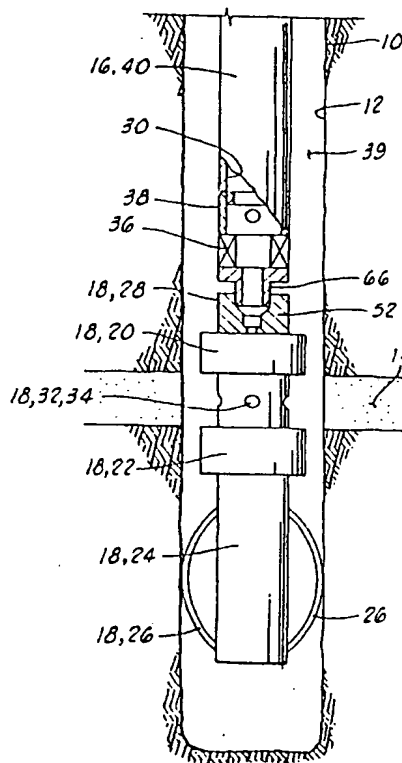


FIG. 1A

EP 0 699 819 A3



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 4 648 448 A (SANFORD) * column 10, line 13 - line 32 * * column 10, line 57 - line 65 * * column 11, line 49 - line 52 * ---	1,2	E21B33/127 E21B33/124 E21B33/12 E21B49/08 E21B27/02 E21B43/25 E21B34/12 E21B34/14
A	US 2 831 542 A (LYNES) * column 5, line 1 - line 15 * ---	1,2	
A	US 4 230 180 A (PATTON) * column 6, line 52 - column 7, line 32 * * column 8, line 55 - line 67 * ---	1,2	
A	US 4 566 535 A (SANFORD) * column 6, line 12 - line 38 * ---	1,2	
A	US 4 580 632 A (REARDON) * column 11, line 52 - column 57 * * column 13, line 52 - column 14, line 6 * ---	1,2	
A,D	US 4 246 964 A (BRANDELL) * column 11, line 34 - line 48 * ---	1,2	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	US 4 729 430 A (WHITE) * column 18, line 35 - line 65 * * column 19, line 65 - column 20, line 2 * ---	1,2	E21B
A,D	US 3 327 781 A (NUTTER) * column 6, line 30 - line 69 * * column 7, line 4 - line 11 * ---	1,2	
A	US 4 962 815 A (SCHULTZ) * column 8, line 52 - column 9, line 12 * ---	1,2	
A	US 2 978 046 A (TRUE) * claim 1 * ---	1,2	
A,D	US 3 107 729 A (BARRY) * column 6, line 57 - column 7, line 56 * -----	1	
The present search report has been drawn up for all claims.			
Place of search THE HAGUE		Date of completion of the search 14 August 1997	Examiner SOGNO M.G.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

EPO FORM 1503 03 02 (P04C01)



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claims:
- No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet -B-

- All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respects of which search fees have been paid, namely claims:
- None of the further search fees has been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims: 1 + 2



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1,2

Method of servicing a well comprising running an inflatable packer with a tubing string, closing the inflation passage by surface manipulation of said tubing string and running an inner well tool for opening communication with the formation.

2. Claims: 3,4

Method of servicing a well comprising running a straddle packer with a tubing string, setting said straddle packer and running an inner well tool for opening a circulation valve.

3. Claims: 5-8

Method and apparatus for testing a well comprising running a packer with a tubing string, setting said packer and running an inner tubing string for opening a communication passage with the formation.

4. Claims: 9,10

Method of treating a well comprising running a packer with a tubing string, setting said packer and running an injection tool for injecting a treatment fluid from said tool into the formation.

The common technical features between independent method claims 1, 3, 5 and 9, which comprise running packer means with a tubing string, setting said packer means and running an inner apparatus for opening a passage, are already known, see for instance document US-A-3327781 cited in the description and in the search report.

Thus, the remaining potentially special technical features of independent method claims 1, 3, 5 and 9, as listed above, are different.

Independent method claim 5 and independent apparatus claim 7 (third invention) have corresponding features.

The general problem of treating or testing a well by running packer means, setting said packer means and running an inner apparatus has already been solved by the system according to document US-A-3327781. Therefore the remaining potentially special technical features of the four inventions cannot be considered as corresponding special technical features. Thus there exists lack of unity of invention.
